

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Marlow, et al.

Serial No.: 09/773,580
Filed: February 2, 2001
For: PAPER ELIMINATION IN THE PRODUCTION OF
BATTERY PLATES

Examiner: Boyer D. Ashley
Art Unit: 3724
Our File: T8-465812US2

August 16, 2004

DECLARATION OF THOMAS LESTER OSWALD UNDER 37 C.F.R. §1.132

Honourable Commissioner of Patents and Trademarks
Arlington, Virginia 22202
U.S.A.

Sir:

I, THOMAS LESTER OSWALD, hereby declare that:

1. I graduated from the University of Wisconsin in Madison in 1953 with Bachelor of Science Degrees in Chemical Engineering and Naval Science. I was a co-inventor of the invention disclosed and claimed in U.S. Patent Application Serial No. 09/773,580 filed February 22, 2001 while I was retained by the assignee Cominco Ltd. (now Teck Cominco Metals Ltd.) as a technical advisor on an as-needed basis. Prior to my retainer by Cominco Ltd., I was employed in the lead battery industry throughout my working career as follows:

Employment History:

- 2 -

1959 – 1966 Process Engineer in the Automotive Battery Division of Globe Union Inc., Milwaukee, Wisconsin (Now a division of Johnson Controls, Inc.).

1966 – 1993 Various management positions in Automotive Battery Engineering of Gould-National Batteries, Inc. (later known as Gould, Inc., GNB Batteries, Inc. and GNB, Inc.)

1993 – 1997 Engineering Manager in the Automotive Battery Division of Johnson Controls, Inc.

1997 – to date Self-Employed consultant to the battery industry.

I hold six U.S. Patents in the areas of battery design, manufacture and testing. Both of companies Globe Union Inc. and GNB, Inc. were known for their technical innovations in both product and process design by the automotive battery industry during the period of my employment. These include initial development of:

- Thin wall thermoplastic battery containers,
- Cast-on-Strap production equipment,
- Through-the-partition intercell connections,
- Cast Grid Maintenance Free Batteries,

and are the basis for automotive battery design and production throughout the world to the present day.

5. As a co-inventor I am familiar with the invention described in the above-identified application and have reviewed the Office Action dated May 18, 2004 together with the references, i.e. U.S. Patent No. 3,859,135 to Roberts, et al. (Roberts), U.S. Patent Publication No. 2002/0124388 to Chen et al. (Chen) and Applicant's Admitted Prior Art (AAPA) cited therein in combination to reject the claims of the application. I make this Declaration in support of the applicants' response filed March 5, 2004 that AAPA in view of the Roberts and Chen references do not teach, suggest or render obvious the invention as presently claimed.
6. Applicants' prior art process (AAPA) illustrated in Figures 1 – 3 of the present application comprises cutting expanded continuous metal mesh strip which has been continuously saturated and coated on each side with paste and covered on each outside surface with a paper barrier. Applicants and the battery industry

- 3 -

world-wide for the past 30 years of manufacture of battery plates from continuous pasted mesh strip typically have applied and continue to apply a lower paper barrier to the underside of continuous expanded metal mesh strip before saturation with paste from a paste hopper and then covered the pasted strip with an upper paper barrier. The paper barriers heretofore have been necessary to obviate sticking of the freshly-applied paste to the plate cutter dies and anvil roll, which operate as pressure cut dies. Pressure cut dies, otherwise known as "steel rule" dies, function by interaction of a sharpened blade against a smooth hard anvil surface. The cutting pressures are high to enable the sharpened blade to push through the material to be cut. The cutting blades typically are six inches long and impress considerable force on the expanded metal mesh strip during the cut, which is believed to exacerbate sticking of battery paste to the cutting surfaces, anvil roll and cutter blades.

7. As pointed out on to page 2, lines 6 - 17 of this application, many attempts have been made by manufacturers, suppliers and the battery industry in general since the mid-1970s to eliminate the need for paper barriers because of cost considerations and numerous production problems, such as paper clogging and paper release interfering with cell welding, without success. I was an employee of GNB, Inc. and was involved in the acquisition and testing of the first AAPA apparatus in 1987 and the installation of the AAPA apparatus in a pilot plant in an attempt to sever and divide paperless pasted strip, after flash drying. The trial was unsuccessful since the paste continued to adhere to the cutters notwithstanding prior flash drying of the paste. Because of the high cutting pressures of the AAPA process and continued adherence of flash dried paste during the trial, it was not expected that the heating of cutting surfaces would obviate sticking of the paste to the cutting surfaces.
8. Although Applicants and manufacturers, suppliers and the industry in general are persons skilled in the art, it took many years of research to develop a process for cutting continuous pasted metal mesh strip which could be accomplished without the presence of paper barriers. No one in the art of manufacture of battery plates from continuous metal mesh strip heretofore could avoid the need for paper barriers in spite of encouragement from equipment suppliers and battery plate manufacturers for processes and equipment to provide reliable and continuous production without costly shut-downs because of paper related problems.

- 4 -

9. Chen is cited to "disclose the need/desire in the art to have paperless battery plates" and discloses "a different method for cutting and handling the paperless battery plates" (Page 3 of Office Action issued May 18, 2004). Chen acknowledges that the absence of pasting papers enhances battery performance "...pasting papers are not necessary, which will benefit initial electrical performance of the batteries." (par. 0030, lines 7 - 9). Chen thus clearly corroborates the need in the art for paperless battery plates.
10. The process disclosed by Chen requires a control system for introduction of a polymer binder which then passes through a drying step in which water is vaporized and in which polymerization occurs in the paste (par. 0030, lines 4 - 6). The addition of polymer (Figure 2 of Chen) not only requires an additional process step for introducing the polymer but also necessitates an additional step for polymerisation of the polymer and vaporization of water which renders the Chen product frangible and the paste diluted relative to applicants' product. The Chen process thus differs from applicants' process and requires additional, probably more exacting, controls for the polymerisation and drying phases.
11. Chen thus confirms a need for paperless battery plates but discloses a different and more costly process than applicants' process without explaining how to cut pasted plates. Applicants on the other hand are able to continuously paste strip with a fresh, sticky conventional paste and sever the freshly pasted strip to produce battery plates of desired configuration on an assembly line operating at commercial speeds on a continuous basis without the need for a costly polymer binder and control system for applying and curing the binder.
12. Roberts is cited to teach "...that it is old and well known to heat metal elements that come in contact with paste to prevent sticking to the paste" and is not "being relied upon to teach that it is old and well known in the art to heat blades to prevent sticking with blades...". (Page 3 of Office Action issued May 18, 2004).
13. It is further stated, on page 3 of the Office Action issued May 18, 2004, "One of ordinary skill in the art readily recognizes the need to prevent paste from sticking to the cutting blades. The teachings of Roberts would suggest to one of ordinary skill in the art to try heat blades with paste because Roberts discloses that heat elements in contact with paste prevents sticking. One of ordinary skill

- 5 -

in the art would be reasonably apprised to try heat blades to prevent the paste from sticking to the blades."

14. I have been continuously engaged in the design and manufacture of battery plates since 1959 and agree that, as a skilled person in the art of battery plate manufacture for forty-five years, the need to prevent paste sticking to cutting blades has been long recognized. It was not until 1998 that tests were conducted by applicants to assess whether or not the heating of cutting blades would obviate the problems of paste sticking to the cutting blades. Notwithstanding the teachings of Roberts and AAPA, and the long-felt need for paperless plates, no one during the 30-year co-existence of Roberts and AAPA had combined their teachings. Roberts discloses a rotary cutter having a pair of unheated wires for severing a strip of paste extruded onto discrete plates and does not suggest heating of the cutters to obviate the sticking of paste. Applicants' rotary cutter operates under extremely high pressure to sever a continuous, freshly-pasted metal mesh strip into discrete paperless plates.
15. I thus am well aware of the long-felt need in the battery industry for a process to obviate the presence of paper barriers in the continuous production of paperless battery plates from pasted continuous metal mesh strip wherein the process necessitates penetrating under high cutting pressure a thickness of metal mesh freshly saturated with paste extending from one side of the mesh to the other side of the mesh and the failure of the industry to meet this need. The present invention meets this long-felt industry need and has been accorded substantial interest and recognition by the battery industry. Although only recently introduced to the market, the apparatus of the invention has achieved a significant degree of commercial interest. One U.S. battery producer (Douglas Battery Manufacturing Company, which supplies most of the original equipment batteries to BMW North America) has run production line trials and one major Mexican battery producer (Enerya, a division of Grupo Gonher, a major supplier of automotive parts in Mexico) has set aside valuable production time and has completed two production line trials and plans a third trial preparatory to full time production of paperless plates.
16. The applicant has provided an economically feasible solution permitting high-speed commercial production of freshly-pasted battery plates from continuous metal strip without the need for polymers or other additives or the use of paper

- 6 -

barriers. To my knowledge, there is not another battery plate product on the market that can meet the specifications and economic feasibility of battery plates produced by the process and apparatus of the present invention. Applicants' process and apparatus finally provide an inexpensive and reliable solution to resolve a long-felt need, thus providing evidence of the novelty and unobviousness of the presently claimed method.

17. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that wilful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such wilful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Roseville, Minnesota and dated this 17th of August, 2004.


THOMAS LESTER OSWALD

TOR_LAW\5788632\1